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A Vertebrate Survey of Kasota Prairie

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ABSTRACT. Kasota Prairie is a 30-acre tract of near-virgin prairie in Le Seur County, Minnesota. The vertebrate population at the prairie was studied to determine its significance as habitat for those species. Several species of birds which require prairie or prairie-like habitat were found to be nesting there. Many other avian species also utilize the area for feeding purposes. Small mammal populations were highly influenced by annual prairie maintenance burning.

Kasota Prairie as used in this paper is a 30-acre tract approximately 8 miles north of Mankato near the small town of Kasota. The prairie is a unique remnant of the vast prairie ecosystem that once dominated thia region. An intensive floristic study of the area recorded 44 plant species considered rare or endangered in Minnesota (Kramer, 1975). (Morley, 1972), also has studied and recorded endangered Minnesota flora and noted the condition on Kasota Prairie. Kramer's study called the Kasota Prairie "priceless in its genetic diversity."

Before 1969 annual mowing occured on the prairie. It has been undisturbed since, except for prairie maintenance burning. For burnig purposes, the area has been divided into north and south halves (Fig. 1). The first controlled burning was on May 3, 1976, and successive burns were on April 15, 1978, April 22, 1979, and May 12, 1980. The south half was burned first; then the north, with alternating burns thereafter.

Burning dates preceded the arrival of nesting birds to the Kasota Prairie site. Any large mammals on the site during the burns could easily flee the flames to safety. Animals with burrows more than 1 to 2 inches below the surface of the ground survive surface burns of the type used on the prairie. The only animal that might suffer high rates of mortality from these burns is the Meado Vole *(Microtus pennsylvanicus)* since it frequently resides in nesting material at ground level.

Included within the study area adjacent to and directly east of the prairie was a pasture which allows for certain comparisons. It was similar to the prairie except for being heavily grazed and lacking significant vegetative cover.

In an attempt to quantify all the vertebrate fauna occupying and utilizing Kasota prairie, several methods were employed. Birds were identified by observation, and an attempt was made to locate and identify any nests. Small mammals were captured in homemade live traps, modified from Fitch (1950). Sunflower seeds and peanut butter were used for bait. All animals trapped were marked by the toe-clip method to identify any recaptures. Large mammals were noted by observation and by track identification. Reptilian and amphibian identification was mainly by observation and by the use of snake traps. These traps consisted of 14-foot, one-by-ten inch pine boards extending into a funnel leading to a four-quart jar at each end.

Survey of nesting birds

The nesting bird survey was conducted on four two-day periods from June 5, 1980, to June 28, 1980. By including the pasture in the study area, the results could be used to compare and contrast a heavily grazed pasture's bird population with that of a relatively natural area. No attempt was made to record densities of avian species, but some relative estimate was still possible because of the frequency of observation of a particular species.

East-West transect lines of 50 m were established across the prairie and were extended about 100 m into the adjacent pasture (Fig. 1). This amounted to eight passes through the study site on each observation date. Each bird observed was identified to species and sex, and the location where first observed was recorded to reflect movement. Moreover, comparisons could be made with the recently burned northern half of the prairie and the unburned southern half, as well as the grazed pasture.

Seventeen species of birds were observed throughout the complete study area. The major order observed was Passeriformes making up 14 of the 17 species identified (Table 1). Six species were observed only once; the Red-winged Blackbird *(Agelaius macroura)*, Northern Oriole *(Icterus galbula)*, Horned Lark *(Eremophila alpestris)*, American Robin *(Turdus migratorius)*, Brown Thrasher *(Toxostoma rufum)*, and the Upland Sandpiper *(Bartramia longicauda)*. Counts were not available for multiple sightings of other species.

The Killdeer *(Charadrius vocifenus)*, Upland Sandpiper, and Horned Lark preferred the open area offered by the grazed pasture. It was probable that they were nesting there although no nests were found. Grasshopper Sparrows *(Ammodramus savannarum)*, and to a lesser extent Western Meadowlarks *(Sturnella neglect* were seen relatively often in the pasture. They seemed to be utilizing the area for feeding purposes. A single Black Cherry tree *(Prunus serotina)* was the nesting site of the Eastern Kingbird *(Tyrannus tyrannus)* (Fig. 1). The nest was destroyed sometime between June 7 and June 11 by an unknown factor. Nesting Wester Meadowlarks, Field Sparrows *(Spizella pusilla)*, Dickcissels *(Agelaius phoeniceus)*, Grasshopper Sparrows and a single bobolink *(Dolichonyx oryzivorus)* were always observed on the unburned southern half. No breeding females were noted on the burned half possibly because of the lack of nesting material and suitable ground cover. Males were observed singing in relatively high positions offered by the fence line, Snowberry stands *(Symphoricarpus albus)* and occasional patches of wild plum *(Prunus americanus)*. American Goldfinches *(Spinus tristis)*, Common Grackle *(Quicalus quicalus)*, Brown Thrasher and Northern Oriole were utilizing the area for feeding purposes. Their nesting territory was probably in the nearby forested area across the road to the west. Goldfinches were observed in large feeding flocks early in the study period before their breeding season. Any of several groves within one-half mile of the prairie or wooded bluff to the west could have been the nesting territory of those species utilizing the prairie (Fig. 1).

Mammal Survey from tropline captures

The small mammal trapline was ran over two 1 week periods from June 27 through July 3, 1980. Transect lines were estab-

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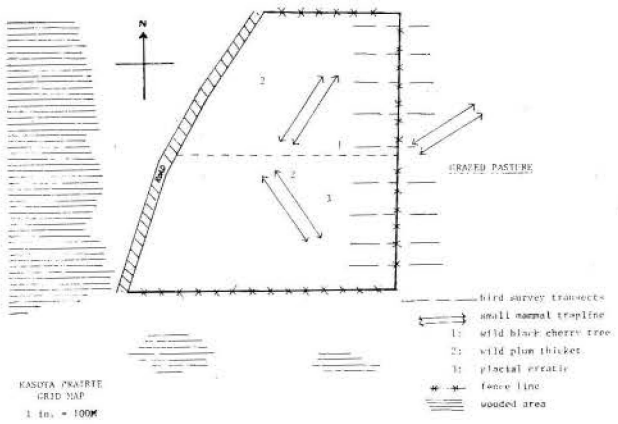

Fig. 1. Prairie showing north-south division and selected features.

lished on the burned and unburned portion of the prairie and on the grazed pasture. Two rows of traps were set in a grid pattern at 15 M intervals (Fig. 1).

A total of 60 traps were run during the first trapping period with the following distribution: 20 in the burned portion of Kasota Prairie, 20 in the unburned portion and 20 in the adjacent pasture. Traps were checked three times daily during the first trapping period: 7:00 a.m., 1:00 p.m., and 8:00 p.m. This was done because Thirteen-lined Ground Squirrels *(Spermophilus tridecemlineatus)* tend to die from overheating and stress during the heat of the day. Both trap days and trap nights must be considered since Thirteen-lined Ground Squirrels are diurnal. Also since traps were checked thrice daily, there was a possibility of a double capture in the same trap. Prairie Deer Mice *(Peromyscus maniculatus)*, since they are nocturnal, were only considered in trap nights.

Prairie Deer Mice: During this period four captures were recorded, all in the burned portion of Kasota Prairie. Of these, one individual was captured twice. The 60 traps represent a total of 420 trap nights. Therefore, the capture success was less than one percent. In comparison with 140 trap nights on the unburned portion of the prairie, there was a capture success ratio of three percent. The low density of the Prairie deer mouse was attributed to their relatively large home ranges (2.6 ha) by Brant (Cook, 1959). Brant, (1953), also stated that they require a more permanent nesting site and/or rock outcroppings and occasional brush. There are very few brushy areas and large rock outcroppings at Kasota Prairie.

Thirteen-lined ground squirrels: A total of 18 Thirteen-lined ground squirrels were captured, marked and released. Even though the traps were checked thrice daily, five died in the traps, presumably from heat exposure and stress. Nine recaptures were recorded for a total of 32 captures. Of the 420 trap days, this represents a success ratio of 7.7%. If the three individual areas are considered a different picture emerges: burned prairie (17 captures, 140 trap days) success 12.1 percent, unburned prairie (2 captures, 140 trap days) success 1.4 percent, and the grazed pasture (13 captures, 140 trap days) success 9.3 percent. The two captures recorded in the unburned part of the prairie were within 20 m of the burn line. In a study done by M. Frydendall and several Mankato State University students in 1973 a success ratio of 3.75 percent was obtained. No burns had occurred on the prairie before 1976. These results indicate that Thirteen-lined ground squirrels prefer the open nature of an area brought about by burning or grazing. Thirteen-lined ground squirrels rely on keen visual observation to detect and escape predators. The new vegetative growth stimulated by burning was probably also attractive to them as a food source.

During the second trapping period traps were unset in the morning and reset in the evening to avoid catching Thirteen-lined Ground Squirrels. The relative abundance and location of this species had been established and their capture was no longer desired. Some early morning and late evening captures were recorded, however.

Although all three study areas were trapped again only Thirteen-lined Ground Squirrels were captured in the grazed pasture. Five Prairie Deer Mice were captured in the burned portion of the prairie. This is a success ratio of 3.5 percent. A previous study recorded only one Prairie Deer Mouse capture in the same area (Frydendall, 1973).

OTHER MAMMALS: Three Meadow Voles were captured, all in the unburned portion of Kasota Prairie. This would be expected since Meadow Voles require at least one year's litter accumulation for runway production and nest building (Fala, 1975). In a study by Beck and Vogel (1972) no Meadow Voles were found in areas that were burned frequently. Frydendall (1973) reported a 10.4 percent trapping success ratio of Meadow Voles at Kasota Prairie. This high density (34 individuals) is probably attributable to the litter accumulation of at least four years prior to that study. No Short-tailed Shrews *(Blarina brevicauda)* were captured on the prairie in 1980. Several captures, however, were noted by Frydendall (1973). These data suggest that both Meadow Voles and Short-tailed Shrews prefer unburned meadows.

Larger mammals were identified by actual observation and signs. Tracking pits to attract carnivores were put out for a week in September, 1980, but showed no results. The den of a Striped Skunk *(Mephitis mephitis)* was located near a large glacial erratic on the south-central part of the prairie d(Fig. 1). The skunk was the only predator observed on the prairie. Several Cottontail Rabbits *(Sylvalagus floridanus)* were flushed from the prairie near the road. Also, during the bird survey in the spring, a White-tailed Deer's *(Odicoilus virginianus)* overnight bedding site was observed. Many Pocket gopher *(Geomys bursarius)*

Table 1. Avian species utilizing Kasota Prairie and adjacent area on specific observation dates.

SPECIES	Observation dates June 5	June 6	June 12	June 13	June 20	June 21	June 27	June 28
Ringneck pheasant	X(s)			X(s)	X*			
Eastern kingbird	X	X**				X	X	
Grasshopper sparrow	X	X	X	X	X	X	X	
Western meadowlark	X	X	X	X	X	X	X	X**
American goldfinch	X	X		X	X			
Bob-o-link		X		X		X	X	X
Upland sandpiper		X***						
Field sparrow	X		X	X	X	X	X	X
Common grackle	X	X	X	X		X		
Brown thrasher		X						
American robin		X						
Horned lark			X***					
Northern oriole			X					
Killdeer					X***		X***	X***
Dickcissel					X	X	X	X
Red-winged black bird				X				
Mourning dove	X	X	X	X	X	X	X	X

(s) -identified by sound only
X -at least one individual of species observed, but no count was attempted.
*** -female with young**
**** -nest observed**
***** -observed only in adjacent pasture.**

mounds were observed throughout the prairie. No mounds were noted in the grazed pasture. There was no evidence of predation on the Pocket gophers by the Badger *(Taxidea taxus).*

Three small mammal species were found on the prairie: Thirteen-lined ground squirrel, Prairie deer mouse and Meadow vole. Their presence and relative abundance was influenced considerably by burning. Prairie Deer Mice tend to avoid newly burned areas, but move into these areas within one to two months after the burn (Fala, 1975). Abundance appeared greater in burned areas where less litter was present. The density of Thirteen-lined Ground Squirrels appeared enhanced by controlled burns. Meadow Voles prefer areas with at least 1 year's litter accumulation. Kasota Prairie provides excellent habitat for Pocket Gophers as was exemplified by their abundance. Of all the predators, only a Striped Skunk was in residence on the prairie.

A follow-up study could be utilized to examine trends in vertebrate fauna on an annual basis and to determine if the presence of other species also may use the area.

The importance of natural areas such as Kasota Prairie must be established to assure their maintenance as ecological islands. Continual and increasing pressure to farm and graze marginal lands amplify this need.

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